



ACTIVITY THREE

ARCTIC ADAPTATIONS

Subjects: Biology, Natural Science

LEARNING OBJECTIVES:

- Identify and explain the adaptations that help polar bears survive in the Arctic.
- Compare and contrast these adaptations with those of other Arctic animals.
- Explain some potential effects of changes in the Arctic habitat.

MATERIALS:

- Photographs of polar bears
- Items for your Dress-Up Box

Wet suit - Blubber for insulation from the cold

Black shirt - Black skin, believed to absorb heat from the sun

Warm coat - Thick fur to retain body heat. A soft underlayer provides insulation, while longer guard hairs add further protection.

White sheet - Camouflage to avoid being seen by prey

Extra large mittens, snowshoes, or flippers - Big paws used as snowshoes for walking and paddles for swimming

Bubble wrap - Bumpy surface of feet for gripping ice

Petroleum jelly - Oily fur that forms a waterproof barrier when wet

Binoculars - Keen eyesight

Swim goggles - Ability to see clearly underwater

Nose clip - Ability to close nostrils underwater

Fish net - Big paws for catching food

Butter knives - Sharp claws and teeth for hunting and eating seals

BACKGROUND:

The Arctic ecosystem is one of the planet's most extreme. Temperatures range from -50° F (-45° C) in the winter to 77° F (25° C) in the summer. Winter brings darkness, miles of sea ice, and snow-covered ground, while summer is characterized by constant light and wide stretches of open water. To survive in these conditions, polar bears and other Arctic animals have physical characteristics and behaviors that are adapted to their habitat. These adaptations have developed over thousands of years of natural selection. Because polar bears are so well adapted to Arctic life, changes in their habitat due to climate change put the bears at risk.

WHAT YOU DO:

1. Gather all the dress-up items from the list on the next page that you can, and place them nearby in a box or bag.
2. Have students look at some photos of polar bears in the Arctic. Ask them to describe the environment where the polar bear lives and to identify some of the bear's physical features.
3. Explain the term adaptation. Adaptations are body parts or behaviors that help a species survive in its habitat.
4. Tell students you are going to adapt one of them for life as a polar bear. Invite a volunteer to come to the front of the group. Ask:
 - Would the volunteer be able to survive in the Arctic equipped as he or she is now? (Students should conclude that the answer is no!)
5. Ask students to name some challenges that polar bears face. If they need a little help with this question ask:
 - How do polar bears find food?
 - How do they get protection from the cold?Then have students call out adaptations that would help the volunteer meet these challenges.
6. As students name body parts that would help the volunteer survive as a polar bear, pull items out of the dress-up box and begin dressing the volunteer. For instance, if a student suggests, "Thick fur to stay warm in the cold," put the warm jacket on the volunteer. Give students a chance to explain the importance of each feature and provide additional information as needed (see the chart for details).



7. Prompt students with questions, if needed, to help them name all the adaptations in the dress-up box. For example:
 - How does a polar bear catch its food?
 - How does it eat it?
8. When the volunteer is all dressed, explain that a real polar bear has all of these adaptations built into its body.

Suggest that the volunteer try walking around in the gear. Would he or she get hot with all those clothes on? Note that polar bears are well suited for the cold but can overheat when summer temperatures climb. In fact, instead of hibernating during the cold season as some animals do, polar bears enter a state of “walking hibernation” in the summer when food is scarce and they need to conserve energy.
9. Now divide the class into small groups and some photographs of polar bears to each group. As students look at the photos, have them point out the adaptations you have discussed. Suggest that they also note features of the bears’ environment for which these adaptations equip them, such as white snow and icy seawater.
10. Ask students to name some other Arctic animals. Follow up with questions such as:
 - What adaptations help these animals survive in their habitat? (For example, other sea-going mammals such as seals and walruses have blubber. Foxes, wolves, hares, and lemmings all have thick fur. Some animals, such as the Arctic fox, ptarmigan, and Arctic hare, change their coats from brown to white for the winter.)
11. Finally, ask students to consider what happens when an animal’s habitat changes.
 - Would a polar bear’s adaptations be an advantage in a different type of habitat or a disadvantage?
 - How might climate change affect the bears?
12. Explain that not only are polar bears physically adapted to a cold climate, they also depend on the floating sea ice to hunt for seals. As the climate warms, this ice is present for less of the year. The decreased ice cover means their hunting season is getting shorter, so they can store less fat for the summer season when food is scarce. That’s why many scientists are concerned about polar bears and working hard to find ways to help them. And it’s just one of the reasons why people around the world are trying to find ways to help slow down climate change.

ADAPTATIONS:

For younger students. Adaptations.

For older Students. Adaptations

USEFUL LINKS:

Helpful Web sources about polar bears include: polarbearsinternational.org; seaworld.org/animal-info/info-books/polar-bear/index.htm.